

SELF-ALIGNED BORDERLESS CONTACTS

ABSTRACT

A method for forming high-density self-aligned contacts and
5 interconnect structures in a semiconductor device. A dielectric
layer thick enough to contain both interconnect and contact
structures is formed on a substrate. A patterned hardmask is
formed on the dielectric layer to define both the interconnect
and contact structures. The openings for interconnect features
10 are first formed by partially etching the dielectric layer
selective to the hardmask. A second mask (e.g., a resist) is
used to define the contact openings, and the dielectric layer is
etched through the second mask, also selective to the hardmask,
to expose the diffusion regions to be contacted. The patterned
15 hardmask is used to help define the contact openings. Conductive
material is then deposited in the openings which results in
contacts and interconnects that are self-aligned. By first
forming the openings for both interconnect and contacts, savings
in processing steps may be obtained.